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(54) **DYNAMIC ADJUSTMENT OF APPLICATION RESOURCES IN A DISTRIBUTED COMPUTING SYSTEM**

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(58) **Field of Classification Search**

None

See application file for complete search history.

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(57) **ABSTRACT**

A new snapshot of a storage volume is created by instructing computing nodes to suppress write requests. Once pending write requests from the computing nodes are completed, storage nodes create a new snapshot for the storage volume by allocating a new segment to the new snapshot and finalizes and performs garbage collection with respect to segments allocated to the previous snapshot. Subsequent write requests to the storage volume are then performed on the segments allocated to the new snapshot. An orchestration layer implements a bundled application that is provisioned with virtualized storage and computation resources. A snapshot of the application may be created and used to rollback or clone the application. The amount of processing cores, memory, and containers of the bundled application may be increased or decreased based on usage. Components of the bundled application may be assigned to nodes to satisfy affinity and anti-affinity rules.

18 Claims, 31 Drawing Sheets